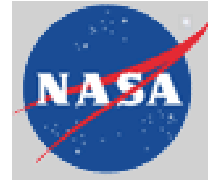
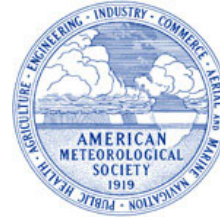


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FOR IMMEDIATE RELEASE  
March 5, 2002

## **NASA STUDY LINKS EL NIÑO AND SOUTHERN OCEAN CHANGES**

NASA researchers have found strong relationships between El Niño episodes and changes in climate and sea ice cover around Antarctica.

Identifying these relationships is important because it provides new insights into the changing characteristics of the Antarctic region and their role in Earth's climate system.

The findings, published in the March 1 issue of the American Meteorological Society's *Journal of Climate*, show that although the total ice coverage of the southern ocean has not changed significantly over the last 20 years, the El Niño and its related Southern Oscillation appear to affect regional ice distributions. The oscillation is a recurring warming and cooling of the surface ocean in the central and eastern Pacific. El Niño refers to the warm phase of the oscillation.

"Understanding the connection between the Southern Oscillation and southern ocean climate and the sea ice cover will substantially improve our understanding of global climate," said Dr. Ron Kwok, a senior research scientist at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "Our study concludes that the southern ocean's climate and ice cover is somehow connected to climate in the tropical latitudes. While we don't know yet the cause-and-effect relationship between the two, we do know the changes in sea ice cover cannot be explained by local climate variations alone and are instead linked to larger scale climate phenomena."

The study was conducted by scientists at JPL and NASA's Goddard Space Flight Center, Greenbelt, Md. It is based on data from 1982 to 1999. The NASA scientists also noted changes in sea ice cover in regions not normally associated with El Niño, such as the Weddell Sea east of the Antarctic peninsula.

The strongest links were observed in the Amundsen, Bellingshausen and Weddell seas of the west Antarctic, where the connections are localized and well defined. Within these sectors, higher sea level pressure, warmer air temperature and warmer sea surface temperature are generally associated with the El Niño phase.

A number of observations in the scientific literature can be explained by this El Niño Southern Oscillation connection. Examples include a record decrease in sea ice coverage in the Bellingshausen Sea from mid-1982 through early 1999; the reduced sea ice concentration in the Ross Sea; and the shortening of the ice season in the eastern Ross, Amundsen and far western Weddell seas. Four El Niño episodes over the 17 year period occurred at the same time as ice cover retreats in the Bellingshausen and Amundsen seas, showing unique associations between the Southern Oscillation and this region of the Antarctic.

"The study shows that the impact of El Niño is global and that processes as remote as those in the polar regions are affected," said co-author Dr. J. Comiso, senior research scientist from Goddard. "The effect can be profound since these El Niño episodes affect the Weddell and Ross seas. These areas are regarded as key sources of cold and dense bottom water that influences global ocean circulation. Also, the ice cover in the Bellingshausen Sea is the habitat for a wide variety of marine life and is crucial to their survival."

Data for the study were acquired from several sources, including satellite data from the National Oceanic and Atmospheric Administration, Washington, D.C.; climate data from the joint data set of the National Centers for Environmental Prediction, also in Washington, and the National Center for Atmospheric Research, Boulder, Colo.; sea ice data from the National Snow and Ice Data Center in Boulder; and sea ice motion data from JPL's Remote Sensing Group.


The complete paper, "Southern Ocean Climate and Sea Ice Anomalies Associated with the Southern Oscillation," is available to journalists from Alan Buis at (818) 354-0474.

The American Meteorological Society is the nation's leading professional society for scientists in the atmospheric and related sciences. The study was funded by the Cryospheric Sciences Program within NASA's Earth Science Enterprise, a long-term research effort dedicated to understanding how human-induced and natural changes affect our global environment.

JPL is a division of the California Institute of Technology in Pasadena.

03/05/02 CM  
2002-054

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